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Systemic versus local analgesia for chest drain removal in post cardiac surgery patients: The taming of a beast

Mohammed Abd Al Jawad [a], Ihab Ali [a, *], Hoda Shokri [b], Mohammed S. Shorbagy [b]

[a] Department of Cardio-Thoracic Surgery, Ain Shams University, Cairo, Egypt
[b] Department of Anesthesiology, Ain Shams University, Abbasya Square, Cairo, Egypt

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ABSTRACT

Background: Among the most emotionally distressing experiences in cardiac surgery is the removal of mediastinal drains. The study compared between two commonly used methods for pain control during the procedure of chest drain removal. We either used systemic administration of IV morphine or local infiltration of Bupivacaine as a mode of analgesia. Our goal was to provide effective analgesia and patient comfort, while keeping high standards of patient safety.

Methods: A prospective, randomized, single blinded observational study conducted in a single institution; Cardio-thoracic surgery Academy, Ain −Shams University, Cairo, Egypt. 70 Patients, with valvular heart lesions needing elective surgical intervention in the form of valve replacement/repair were enrolled in the study. On the day after surgery, when the mediastinal drains were no longer surgically needed, patients were randomized to one of two groups. In the first group (Morphine group, n = 35), patients received an IV bolus of 0.1 mg/kg morphine over a period of 2 min. The second group (Bupivacaine group, n = 35), received 0.5% bupivacaine as subcutaneous infiltration around the sites of drain insertion, using a standardized technique. Drains were removed 20 min later. All the patients had their blood pressure, heart rate and the pain score on a Visual Analog Scale (VAS) assessed 20 min before starting the procedure (baseline values), and were assessed one more time, 5 min after completion of the procedure (drain removal values).

Results: The median difference within the bupivacaine group between baseline and drain removal VAS scores was 19.94 ± 2.36 mm and 9.52 ± 2.41 mm respectively (this showed to be highly significant, $P < 0.001$).

Median VAS scores difference between the bupivacaine and morphine groups on drain removal were 9.52 ± 2.41 mm and 18.93 ± 2.96 mm respectively (this showed to be highly significant, $P < 0.001$).

Conclusions: There was a significant difference with regards to patients' pain control between both groups. Concerning pain scores (VAS) reduction at post procedural point, a local subcutaneous infiltration of 0.5% bupivacaine is a superior analgesic modality.

* Corresponding author.
E-mail addresses: Mohammed_abdaljawad@med.asu.edu.eg (M.A. Al Jawad), drihababdelrazek@hotmail.com (I. Ali), drhoda10@yahoo.com (H. Shokri), Dr.mohammedelshorbagy@gmail.com (M.S. Shorbagy).

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1. Introduction

Postoperative pain experience is often complex and multifactorial. It included both somatic and emotional stresses. Post-operative pain in cardiac surgery has two major stages [1]. These can be described as early post-operative stage and the later step-down analgesia stage.The early stage concentrates mainly on minimizing oxygen consumption while patients re-establish their normal physiology. The step-down analgesia is aiming at minimizing pain, facilitating tube tolerance and minimizing anxiety while optimizing patient recovery goals such as extubation and mobilization [2]. Inadequate pain control post surgery can cause various respiratory adverse effects like pneumonia and lung collapse [3].

Among the emotionally most distressing experiences in cardiac surgery is removal of mediastinal drains, that some patients describe it as an “unpleasant” up to a “soul reaper” experience [4].

Though in our institution we reached a simple unified protocol for the early post-operative stage, we still lack a unified step-down analgesia protocol; that is still much “personal physician experience” or “doctor oriented” rather than being “patient oriented” especially during mediastinal drains removal procedure.

We aimed to reach such a unified protocol for drain removal that provides effective patient comfort and safety by comparing two common methods for pain control either subcutaneous bupivacaine infiltration or IV morphine.

2. Patients and methods

After the approval of medical ethical committee of Ain Shams University, this prospective randomized single blinded parallel group study was conducted over 70 patients. There age ranged from 20 to 55 years with physical status I and II, scheduled for elective valve replacement/repair surgical procedures. A written informed approval/consent was collected from all the candidates. This study was carried out in Cardio-thoracic surgery Academy, Ain −Shams University, Cairo, Egypt, between May 2016 and May 2017.

Patients suffering from neurological dysfunction, receiving anti-psychotic and anti-depressant drugs, diabetic patients, patients with impaired renal or respiratory functions or patients who required insertion of intercostal/pleural drains due to breaching of pleural cavity at any stage of surgery and finally patients whose drains were required to stay in for more than 24 h after extubation due to bleeding or any other surgical cause were all excluded from our study.

Exclusion criteria also included patients requiring more than 60% oxygen via face mask to keep Po2 above 75 mmHg, if Pco2 was above 50 mmHg, or if they were incapable of adequate communication.

Early postoperative, the unified protocol for early stage pain management was applied for both groups using Propofol and Remifentanil on arrival to intensive care unit (ICU), stopping Propofol when the patient was warm, hemodynamically stable and no major blood loss. Gradual reduction of remifentanil was done to allow spontaneous ventilation with tolerance to endotracheal tube till extubation when the patient was awake and cooperative.

On the day following the surgery, mediastinal drains were no longer surgically needed so those patients were randomly allocated by sealed envelope method into morphine group (35 patients) where patients received 0.1 mg/kg morphine IV over a period of 2 min and bupivacaine group (35 patients) where patients received infiltration of 10 mL bupivacaine (0.5%) around the sites of chest drain insertion, infiltrating an imaginary rectangle extending 1 cm lateral to the lateral border of the site of drain insertion and extending superiorly and inferiorly for 1.5 cm.

Surgical drain insertion was unified in all patients using 2 mediastinal drains one 36Fr and the other 40Fr, while avoiding any intercostal drain insertion.

A drug solution was prepared by a doctor who had not participated in the study. The nurses who collected the data were blinded to the nature of the study.

Patients were teached how to use a 100 mm visual analog scale (VAS-0 with end-point labeled “no pain” and 100 to “worst conceivable pain”) [5]. VAS scores were used as primary outcome measures (see Fig. 1).

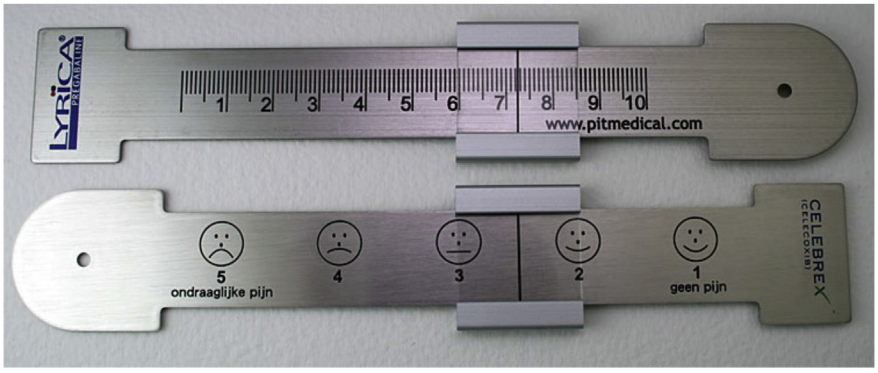

Fig. 1. VAS ruler as a pain assessment tool.

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